

Amendments to the Claims:

This listing of the claims will replace all prior versions and listings of claims in the application:

Listing of Claims:

Claims 1 and 2 (canceled)

Claim 3 (currently amended) A semiconductor device for detecting neutrons comprising:

a semiconductor substrate;

a boron containing layer containing isotope ^{10}B , the layer being formed on said semiconductor substrate;

a PN junction formed on a surface area of said semiconductor substrate below said boron containing layer; wherein

electron - positive hole pairs are generated in a depletion layer of said PN junction by α rays generated by a reaction between said neutrons and said isotope ^{10}B , and the neutrons are detected on the basis of the quantity of electric charge of the electron - positive hole pairs; and

an analyzing circuit portion, which includes a ~~predetermined semiconductor element~~
an amplifier circuit for amplifying a fine signal and a single channel height analyzer circuit for selecting only a pulse with a particular height to estimate an energy spectrum of the α rays with the aid of counting or by measuring peak height distribution using a current flowing through said PN junction, on said semiconductor substrate in a region other than the region where said neutrons are detected.

Claim 4 (previously presented) A semiconductor device for detecting neutrons comprising:

a semiconductor substrate;

a boron containing layer containing isotope ^{10}B , the layer being formed on said semiconductor substrate;

a PN junction formed on a surface area of said semiconductor substrate below said boron containing layer; wherein

electron - positive hole pairs are generated in a depletion layer of said PN junction by α rays generated by a reaction between said neutrons and said isotope ^{10}B , and the neutrons are detected on the basis of the quantity of electric charge of the electron - positive hole pairs; and

an analyzing circuit portion including a predetermined semiconductor element on said semiconductor substrate in a region other than the region where said neutrons are detected, wherein the concentration of said isotope ^{10}B in said boron containing layer in said analyzing circuit portion is lower than that of said isotope ^{10}B of said boron containing layer in the region where said neutrons are detected.

Claim 5 (previously presented) A semiconductor device according to claim 3, wherein no boron containing layer is provided on said analyzing circuit portion.

Claims 6-8 (canceled)
